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An Evaluation of Football Injuries in South Dakota High Schools During the 1975 Season

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AN EVALUATION OF FOOTBALL INJURIES IN SOUTH DAKOTA HIGH SCHOOLS DURING THE 1975 SEASON

BY

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This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirement for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Advisor Date

Head, Health, Physical Education and Recreation Department Date

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CHAPTER I

INTRODUCTION

Significance of the Study

Over the years, interscholastic football programs have attracted a large number of participants. At present, there are approximately 1.2 million young men participating in high school football in the United States.[1] This number is increasing at a rate of eight per cent each year.[2] With the increasing number of participants, there has been a subsequent increase in problems related to providing proper medical treatment. Garrick indicated that there is a fifty to one hundred per cent likelihood of participants under the age of nineteen being injured during a scheduled, supervised, four month football season. He also predicted that twenty-five per cent of those injured will not return to normal function for a week or more. One participant in twenty will be hospitalized and over one-half of those injured will require surgery. Unfortunately, only about one-half of those

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[1]Carl S. Blyth and Frederick O. Mueller, An Epidemiologic Study of High School Football Injuries in North Carolina - 1968-1972, U. S. Consumer Product Safety Commission Publication 5203-0054, (Washington, D. C.: U. S. Government Printing Office), p. 3.

[2]Editorial opinion expressed on the ABC Television Network, A News Closeup, in a broadcast ("Danger in Sports: Paying the Price"), on ABC Television, October 14, 1974. (Video tape on file with Dr. J. Garrick, Division of Sports Medicine, University of Washington, Seattle, Washington).

injured seek medical assistance, and one-fourth of those injured do not realize it until sometime later, and thus miss the opportunity for early adequate treatment. Such figures appear to have had little impact on the safety of football as there is little evidence that football is much safer now than it was twenty years ago.[3] A situation which affects over a million of our young athletes annually should be a major concern to parents, coaches, administrators, physicians, equipment manufacturers, and all others involved in high school football.

Football is a collision sport in which injuries will never be totally eliminated, irrespective of measures taken to make the game safer. Football injuries can be drastically reduced in severity and numbers through a concerted effort on the part of everyone involved.[4] Without the data dealing with the number, location and cause of football injuries, the potential for planning for prevention will remain in the realm of speculation. Although researchers in some states have attempted to acquire this type of information, no investigations of this type have been undertaken in South Dakota. The present investigator believed that the accumulation of evidence of this type might be of value to all

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[3]James G. Garrick, "Perspectives in Sports Medicine", American College of Sports Medicine, (Madison, Wisconsin: American College of Sports Medicine), Vol. 6, July 1974, p. 6.

[4]Blyth and Mueller, p. 4.

coaches, members of the medical profession and ultimately, to the players themselves.

Statement of the Problem

The purpose of this study was to determine the number, location, cause, and frequency of occurrence of football injuries that occurred during the 1975 season in South Dakota high schools. An assessment of time-loss due to injury and the extent of medical supervision and care was also included. A second problem was to analyze the data and to formulate recommendations for the improvement of injury prevention and treatment programs.

Limitations and Delimitations

1. Data were collected only on injuries which occurred during practices and games for the 1975 football season as played by high school teams within South Dakota.

2. Data collected included only varsity and junior varsity football practices and games. It did not include sophomore or junior high school football activity.

3. Data were collected only on participants who were unable to continue a practice, a game, or who were restricted from participation in usual activity for one day beyond the date of injury.

4. Qualifications of those persons responsible for the recording were not specified.

Definition of Terms

The following definitions have been included to clarify the terminology used within this study.

1. Biweekly report. A report submitted by respondents every other week.

2. Football activity. Includes varsity and junior varsity football practices and games. Does not include sophomore and junior high football activity.

3. Football season. Includes all practices and games from the first practice session until the end of the final game as designated by the South Dakota High School Activities Association.[5]

4. Full normal activity. Capability of the body and its parts to pass through full, pain-free ranges of motion which allow participation in the activity to the extent that is generally expected of the athlete's teammates.[6]

5. Injury. Traumatic condition which occurs during organized football activity which results in either a discontinuation of participation for the remainder of that practice or game, or results in restricting the athlete's

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[5]Determined by School Year Calendar Committee of the South Dakota High School Activities Association, P. O. Box 1217, Pierre, South Dakota.

[6]Kenneth S. Clarke and Sayers J. Miller Jr., National Athletic Injury/Illness Reporting System Recorder's Handbook, Pennsylvania State University Press, 1974, p. 6.

usual activity for one day beyond the date of injury.[7]

6. Limited activity. Any condition that limits the athlete's ability from completely fulfilling the requirements for full normal activity.

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[7]Carl S. Blyth and Frederick O. Mueller, An Epidemiologic Study of High School Football Injuries in North Carolina - 1968-1972, U. S. Consumer Product Safety Commission Publication 5203-0054, (Washington, D. C.: U. S. Government Printing Office), p. 9.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

Many studies have been completed in which an attempt has been made to determine the cause and frequency of athletic injuries; especially in the sport of football. The majority of these studies have been retrospective, attempting to study the frequency and type of athletic injuries utilizing one of three methods. These methods have included analysis of existing medical records, reviewing insurance claims, or by employing end-of-the-season return-mail questionnaires.

Reviewing the pertinent literature for the present investigation involved an analysis of studies related to all forms of athletic injuries, as well as those which focused on injuries specific to the sport of football. Attention was also given to major problems associated with providing proper medical coverage for athletes.

Studies Related to All Forms of Ahtletic Injuries

The search of the literature indicated that the first reported studies did not appear until the 1930's. In 1933, Lloyd investigated the safety conditions in secondary school physical education. He emphasized the need for this type of research when he stated,

> The purpose of these studies has been to augment the very inadequate data which now exists on the incidence of injuries, the nature of injuries, and the

> causes of these injuries in all aspects of physical education within the gymnasium, the athletic field, and the playground.[1]

There were 510 high schools from twenty-one states that reported a total of 2,370 accidents which resulted in 11,308 lost days from physical education activities as a result of injuries. The activities which were reported to be the most hazardous were touch football, heavy apparatus, and football. Those in which the most serious types of injuries were found were ranked in order of severity as follows: heavy apparatus, touch football, wrestling and football. The areas of the body that were the most often injured were the leg and foot, arm and hand, and head.[2] These particular areas were most often injured during the activities of touch football, heavy apparatus and football.[3]

Gallagher provided information regarding the number and type of injuries which occurred to a group of 650 students at the Phillips Academy in Andover, Massachussetts, between 1940 and 1947. The subjects were all boys ranging in age from thirteen to eighteen. All the boys were required to participate in some form of physical activity or athletics

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[1]Frank S. Lloyd, "Safety in Secondary School Physical Education", The Research Quarterly, (Washington, D.C.: American Physical Education Association), Vol. IV, No. 1, March 1933, p. 5.

[2]Ibid.

[3]Ibid., p. 6.

throughout the year.[4] The data collected were from injuries which required either the admission of the participant to the school's infirmary or some type of attention in the outpatient clinic. For the seven year study period, 59.2 per cent of the participants on the varsity football team and 40.2 per cent of the members of the junior varsity football team were injured. Thirty-five per cent of the varsity football players were admitted to the hospital during the study period and twenty-five per cent of the junior varsity teams were also hospitalized.[5] Sprains, especially to the knees and ankles were found to be most commonly reported injuries. These were followed by concussions and fractures.[6]

Elbel reported the results of four graduate theses investigations that were completed at the University of Kansas. In his study Elbel attempted to summarize the results of four studies completed recording athletic injuries which occurred in Kansas high schools betwen 1930 and 1948. The four studies included only cases which involved payment of insurance claims by the member schools. Injuries that were not of sufficient severity to require medical supervision and

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[4]J. Rosewell Gallagher, "Athletic Injuries Among Adolescents: Their Incidence and Type in Various Sports", ed. Mary Wibel, The Research Quarterly, (Washington, D.C.: American Association for Health, Physical Education and Recreation), Vol. 19, No. 3, October 1948, p. 198.

[5]Ibid., p. 205.

[6]Ibid., p. 212-3.

subsequent submission of an insurance claim were not reported as injuries.[7] In addition, there was an insurance plan that was available to all member schools of the Kansas State High School Activities Association. It must be noted that membership and participation was optional; thus, schools that did not participate in the plan did not provide additional information.[8]

Over the ten year period of the study, 7.13 per cent of all athletes were reported injured. For purposes of competition, the high schools in Kansas were divided into three classes, and the injuries were reported by class. The class in which the largest number of injuries occurred was Class B (7.74%), followed by Class A (7.27%) and Class AA (6.18%).[9] It was found that football accounted for 78.23 per cent of all injuries to surpass in percentage all of the other activities.[10] It was further noted that 57.4 per cent of all of the football injuries occurred in games, and the largest period for the occurrence of injuries was between the fifth and sixth week of the season.[11] Fractures

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[7]Edwin Elbel, "Athletic Injuries in Kansas High Schools", Bulletin of Education, (Lawrence: University of Kansas), Vol. 5, Fall 1950, p. 1.

[8]Ibid., p. 2.

[9]Ibid., p. 3.

[10]Ibid., p. 6

[11]Ibid., p. 11.

led the injury list with 33.59 per cent of all injuries. Of the total number of fractures reported, football claimed 84.2 per cent.[12] Sprains were reported as second in frequency with 21.1 per cent, and dental injuries ranked third with seventeen per cent of the total injuries.[13]

Studies Related to Football Injuries

Burnett and O'Brien conducted a study of high school football injuries in the state of Massachussetts encompassing the 1929-32 football seasons.[14] Surveys were sent to the principal of each high school with a request for information, which included: (1) the number of boys on the squad, (2) the number of injuries and the nature thereof, and, (3) the number of boys in school permanently injured as a result of accidents occurring in previous years. Respondents for approximately ninety-eight schools reported on an annual basis during each of the four years. This accounted for over two-thirds of the high schools in Massachussetts.[15]

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[12]Ibid., p. 19.

[13]Ibid., p. 20.

[14]Joseph H. Burnett and Fred J. O'Brien, "Survey of Football Injuries in the High Schools of Massachussetts", The Research Quarterly, (Washington, D. C.: American Physical Education Association), Vol. IV, No. 3, October 1933, p. 91.

[15]Ibid., p. 92.

In the analysis of injuries, there were no reported fatalities connected with high school football. The injury heading the list in occurrence was sprained knees, while the second most frequent were injuries to the knee joint.[16] Injuries were divided into two categories: major (including all fractures, dislocations, concussions or other serious accidents), and minor (e.g. lacerations, contusions, sprains, etc).[17]

Squad size also influenced the incidence and nature of injuries. Schools with squads of fifty or more players had injury rates between 7.3 per cent and 9.3 per cent, while squads of less than fifty had injury rates between 13.5 per cent and 14.1 per cent. The presence of a physician during high school games resulted in a lower injury incidence and reporting rate than at those games with no physician.[18]

A retrospective study of high school football injuries which occurred in the state of California during the 1932 football season was conducted by Neilson. A discussion to lower age limits of participation in football prompted the study which included every high school (386) in California.[19]

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[16]Ibid., p. 93.

[17]Ibid., p. 95.

[18]Ibid., p. 96.

[19]N. P. Neilson, "The Nature, Frequency, and Age Incidence of Injuries in Interscholastic Football", The Research Quarterly, (Washington, D. C.: American Physical Education Association), Vol. IV, No. 3, October 1933, p. 78.

A letter and answer blank were sent to the principal of each school. The principals were requested to have the blanks completed by a physical education teacher. Information requested included a list of all players who were members of the football team during the past season, their dates of birth, whether or not they had been injured, and for each injured player, the nature of the injury.[20] The purpose of this study was to determine whether the number of injuries to the participants by age groups was so high as to justify lowering the allowable age limit for participation in high school athletic programs from twenty-one to nineteen. The results indicated no relationship between age and the incidence or severity of injuries.[21] The report indicated that a total of twenty-two per cent of all participants were injured. Bruises, sprained ankles and sprained knees were the leading injuries and accounted for 45.7 per cent of all injuries. Bruises alone accounted for 21.6 per cent, while sprained ankles and sprained knees were responsible for 15.4 per cent and 8.7 per cent respectively.[22]

Martin and Fuenning conducted research which supported some of the findings of the 1970 Joint Commission project

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[20] Ibid., p. 79.

[21] Ibid., p. 83.

[22] Ibid., p. 89.

on football injuries. Also included was a list of college football injuries. This was followed by a comparison of the 1970 report and the data from returns of 1969, as well as a report on the 1959 football season. Martin and Fuenning demonstrated the importance of this research when they stated,

> The 1970 report was one of the most complete college football injury reports to date in that it represented a wide variety of schools both in terms of size and geographical location.[23]

Reports included data on the 1,468 participating players who received 2,782 football related injuries.[24] The types of injuries that were most frequent in overall percentages were sprains, followed by contusions, strains, concussions, and fractures. The highest percentage for the body part most often injured was the knee, followed by the ankle, head and face, thigh and shoulder. Defensive injuries (323) were fewer in number than offensive injuries (390) but the nature of the defensively inflicted injuries was much more severe than the offensive injuries. More practice injuries were recorded early in the season, (prior to the fourth or fifth game) as compared to the second half of the season.[25]

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[23]Gary L. Martin and Samuel I. Fuenning, "College Football Injury Surveillance", Athletic Training - The Journal of the National Athletic Trainer's Association, (Greenville, North Carolina: National Publishing Company), Vol. 7, No. 4, September 1972, p. 109.

[24]Ibid.

[25]Ibid., p. 110.

One of the most recent and comprehensive studies was completed by Blyth and Mueller.[26] These investigators conducted a five year epidemiological study of football injuries in forty-five North Carolina high schools within a one hundred mile radius of Chapel Hill, North Carolina.[27]

In this study investigators traveled to each of the forty-five schools once a week and personally interviewed the injured athletes. Data were collected from 8,776 student athletes of which 4,287 (approximately 48.8%) were injured.[28] The investigation evaluated a variety of factors which may have influenced the occurrence of football injuries, including: body part affected, height, weight, age, playing experience, position, equipment, playing conditions, turf conditions, coaches' experience, coaches' age, coaches' level of education, and playing experience, number of assistant coaches, amount of contact work, distribution of salts and liquids, and size of the school.[29]

Results of the five year study indicated that the most common injuries, in order of occurrence were: sprains,

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[26]Carl S. Blyth and Frederick O. Mueller, An Epidemiologic Study of High School Football Injuries in North Carolina - 1968-1972, U. S. Consumer Product Safety Commission Publication 5203-0054, (Washington, D.C.: U. S. Government Printing Office), p. 8.

[27]Ibid., p. 46.

[28]Ibid., p. 72.

[29]Ibid., p. 73.

contusions, strains, fractures, lacerations, and contusions which when combined, accounted for seventy per cent of all of the injuries reported.[30] The knee, ankle, head and neck were the most frequently injured body parts.[31] Injuries incurred during practices accounted for fifty-one per cent of all injuries.[32] The majority of injuries (31 per cent) were caused by a blow from an object (usually a helmet). Collisions between players were the second highest cause of injury closely followed by twisting or cutting injuries.[33] Smaller schools accounted for the highest injury rates; for example, there were 52.9 per cent from Class 1A and 2A, while there were 48.8 per cent from Class 3A and 47.0 per cent from Class 4A; Class 1A being the largest, and 4A the smallest.[34]

Another study dealing with the occurrence of injuries to participants in high school football was completed by investigators in the state of Washington.[35] Garrick and Requa headed a task force specifically trained in the observation and recognition of athletic injuries. An epidemi-

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[30]Ibid., p. 75.

[31]Ibid., p. 79.

[32]Ibid., p. 90.

[33]Ibid., p. 84.

[34]Ibid., p. 87.

[35]James G. Garrick and R. K. Requa, "Paramedical Surveillance of High School Football Practices and Games", Medicine and Science in Sports, Vol. 6, No. 1, Spring 1974, p. 78.

ological study which encompassed 309 varsity football participants in four Seattle area high schools for the 1973 season was completed. The specialized group of observers were all certified members of the National Athletic Trainer's Association. The observers were stationed full-time at each high school for the purpose of documenting all of the time-loss injuries. For the 1973 season there were 265 time-loss injuries or .86 injuries per participant. Offensive activity was involved with forty-nine per cent of the injuries while forty-three per cent of the injuries occurred during defensive activity. Sprains and strains were the dominant form (57 per cent) of injuries with the thigh being the body part most frequently affected. Injuries to the knee and ankle were the next most common sites of occurrence.

Related Problems Associated with Medical Coverage

The evidence available seemed to support the fact that in some high schools the only time that football players were provided medical or paramedical assistance was during a scheduled game. According to Garrick, twenty-seven per cent of the injuries in football occur during games, leaving seventy-three per cent of the injuries occurring during practice when professional medical assistance was less

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[36]Ibid.

likely to be available. Thus, the major share of the responsibility for the medical care of many of the participating high school football players has appeared to be that of the coaches. The level of participation in sports medicine which these individuals possess appears to be quite variable. Garrick reported that high school football coaches recognize about eighty-five per cent of the game injuries but less than forty-five per cent of the practice injuries. As a result, many practice injuries go unrecognized and thus untreated.[37]

The injury problem is not as severe for professional and college athletes as they usually have more sophisticated medical care. However, these groups represent only five per cent of the total number of participants in the game of football.[38]

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[37]Statement by James G. Garrick on the ABC Television Network, A News Closeup, in a broadcast ("Danger in Sports: Paying the Price"), on ABC Television, October 14, 1974. (Video tape on file with Dr. James G. Garrick, Division of Sports Medicine, University of Washington, Seattle, Washington).

[38]James G. Garrick, "Perspectives in Sports Medicine", American College of Sports Medicine, (Madison, Wisconsin: American College of Sports Medicine), Vol. 6, July 1974, p. 6.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this study was to determine the number, location, cause, occurrence and resultant time loss associated with football injuries that occurred during the 1975 season in South Dakota high schools. Following analysis of the data, the present investigator attempted to formulate recommendations to upgrade injury prevention and treatment programs.

Organization of the Study

This study involved all high schools in South Dakota that sponsored interscholastic football programs during the fall of 1975. The investigator received approval and support for the study from the South Dakota High School Activities Association. The Executive Secretary of the South Dakota High School Activities Association wrote a letter of approval for the study. A photostatic copy of the letter was included in the materials that were sent to all participating schools. A copy of this letter appears in Appendix B.

The broad survey method for the collection of data was employed. Prior to the distribution of the questionnaire and study materials, the letter of transmittal and a sample questionnaire were presented to a select group of experts in the field of athletics and sports medicine. This group

included several football coaches, athletic trainers and practicing orthopedic surgeons in the field of sports medicine who had served as team physicians. After recommendations and subsequent changes, a preliminary introduction of the study and its related materials and forms was presented to football coaches during August 11-13, 1975, at the annual summer high school coaches clinic, which was held in Rapid City, South Dakota. The investigator explained the study to the coaches present and responded to their questions. After a detailed and systematic explanation of the study and the questionnaire, each coach was urged to return a completed questionnaire biweekly throughout the season.

Prior to the beginning of the interscholastic football season, information packets were sent to all head football coaches within the state of South Dakota. For ease of recording, a plan was devised which divided the total number of participating schools by two, and each group of schools reported their injuries every second week. The final reports from each school were received at the end of the respective football season for each school.

Source of the Data

The subjects for this study were all members of varsity or junior varsity football teams of schools within the state of South Dakota during the 1975 season. A total of 193 schools were originally contacted and 189 schools actually participated in the present study. Respondents represented

eight, nine and eleven man football teams, and reported 1,167 injuries. Information from the 145 schools that completed the present study indicated 1,121 injuries. A designated contact person in each school was responsible for the recording and reporting of injured football players. A list of respondents is presented in Appendix A.

Collection of the Data

Data Gathering Methods. The questionnaire method of gathering information was selected due to the ease in obtaining information relative to the number, location, cause, occurrence and resultant time loss of football injuries that occurred during the 1975 season in South Dakota high schools. The questionnaire was described by Good and Scates as being an indespensible instrument used to obtain information in descriptive studies.[1] Galfe and Miller state that the questionnaire is used to gather opinions, attitudes and factual data within an organized, formal structure from those being polled without actually being personally interviewed.[2] Van Dalen and Meyer state, ". . . that for some studies or certain phases of them, presenting respondents

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[1]Carter V. Good and Douglas E. Scates, Methods of Research, (New York: Appleton Century and Crofts, Inc., 1954), p. 614.

[2]Armand J. Galfe and Earl Miller, Interpretating Educational Research, (Dubuque, Iowa: Wm. C. Brown, 1965), p. 27.

with carefully selected or ordered questions is the only practical way to elicit the data."[3]

Construction of the Questionnaire. After consulting with members of the faculty, including the Head Athletic Trainer and the Graduate Health, Physical Education and Recreation Studies Coordinator at South Dakota State University, the present writer prepared the first draft of the questionnaire. Members of the graduate faculty of the Health, Physical Education and Recreation Department at South Dakota State University evaluated the instrument. Following several revisions and subsequent reevaluations, a pilot study was conducted which involved the distribution of the questionnaire to a group of twelve experts consisting of athletic trainers, football coaches, medical doctors, and sports medicine personnel from outside the state for criticisms and other suggestions relative to possible additions and deletions. The final form of the instrument was prepared for mailing. A copy of the questionnaire as used in the present study is presented in Appendix B.

Administration of the Questionnaire. Since the present study was part of a comprehensive state-wide survey to determine other aspects related to athletic practices, a

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[3]Deobold B. Van Dalen and William J. Meyer, Understanding Educational Research, (New York: McGraw-Hill Book Company, 1960), p. 301.

joint letter of transmittal was developed. A copy of the letter of transmittal appears in Appendix B. This letter, together with the letter of sponsorship from the South Dakota High School Activities Association, the injury report cards, two three by five cards to be returned indicating the number of participants, instructions for the study, definitions of terms, schedules of return mailings (Appendix B) and six self-addressed, stamped, return-mail envelopes were included in the double-pocket packet that was mailed to the head football coach at each of the participating high schools. Originally, the study list included 193 schools. This list was compiled based on information presented in the 1974-75 South Dakota High School Activities Association Directory.[4] South Dakota high school football teams are divided into four groups: (1) Class A, which includes the thirty-two largest eleven-man teams, (2) Class B, which includes the remaining eleven-man teams, (3) nine-man football teams, and (4) eight-man football teams.[5] The 1975-76 Directory was not printed and available at the time of the first mailing for the present study.

To evenly distribute the volume of incoming returns,

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[4]South Dakota High School Activities Association, State High School Directory, 1974-75, (Pierre, South Dakota: The Association, 1974).

[5]Ibid.

the 193 football teams were divided into two groups. Each of the two groups returned their completed questionnaires on a biweekly basis. Group I consisted of all eighty-six eleven-man football teams and alphabetically, the first ten nine-man teams. Group II consisted of the remaining nine-man teams and all of the eight-man teams.

It was the present investigator's opinion that the head football coaches of the schools, recognizing the seriousness of the injury problem, would designate a responsible person for the reporting of the data to be included in the study. Upon subsequent completion of the questionnaire, the cards were returned to the present investigator.

Upon receipt of the 1975-76 Directory, it was noted that four schools had dropped their football programs. This reduced the number of potential respondents in the present study to 189. In addition, several schools altered their level of participation (by number of players per team) and adjustments for those changes were made prior to analysis of the data.

The packets containing the injury report cards and related materials were mailed to the head football coaches at each of the participating schools on August 18, 1975. At the end of the second week of the football season, the present investigator contacted all of those participating schools by telephone in Group I who had not responded. These calls were made on the 9th, 10th and 11th of September. The

same procedure was followed for Group II schools who were delinquent in their returns as of the 18th and 19th of September.

Following the end of the fourth return mail date for each group (Group I - September 27, and Group II - October 4), the investigator sent a handwritten post card to each of the schools which had not yet returned any information and also to those who had returned partial information.

A letter was sent on October 25, 1975, to all of the schools that had sent in no information and also to the schools that had sent only partial returns. On November 13, 1975, a final follow-up letter was mailed to all of those participating schools that had incomplete returns as of that date. (See Appendix C.)

During the ensuing weeks, telephone calls were made by the researcher to schools that had not responded to the November 13th letter. Those telephone calls produced additional information from a majority of the schools that had failed to send in the results for the final return period. Reasons given for failure to return the final mailing included: lost envelope, lapse of memory, or the feeling that since they had no injuries during that period they did not feel the necessity to respond.

Data Tabulation. The information on each of the returns was coded (see Appendix D) and then recorded on IBM cards and processed by an electronic computer at the

end of the season. Based upon this information, and after consulting with professionals in the area of athletic training, and reviewing the pertinent literature, recommendations for athletic injury prevention and treatment programs for South Dakota high schools were developed. Of the 189 packets sent to the head football coaches in South Dakota high schools that engaged in interscholastic football in 1975, 145, or 76.71 per cent completed all forms required of respondents.

CHAPTER IV

ANALYSIS AND DISCUSSION OF RESULTS

The purpose of this study was to determine the number, location, cause, occurrence and resultant time loss associated with football injuries during the 1975 season in South Dakota high schools.

Organization of the Data for Analysis

The data for the study were compiled from information received on injury report cards which were completed for each injured athlete. A copy of the injury report card is presented in Appendix B.

The injury report cards were part of a survey packet which included the following items: (1) instructions for the survey, (2) a cover letter of endorsement from the South Dakota High School Activities Association, (3) a letter of introduction from the present investigator, (4) two three by five cards to be returned indicating the number of participants as well as the person responsible for the recording of injuries at each school, and, (5) six self-addressed, stamped, return-mail envelopes to be mailed to the present investigator. Dates established as deadlines for return of each of those items are presented in Table I.

The sample, which included 193 football teams was divided into two groups for ease of tabulation. Group I consisted of all eighty-six eleven-man football teams and

the first ten nine-man football teams as listed alphabetically. Group II consisted of the remaining nine-man football teams, and all of the eight-man football teams. Return-mail envelopes for each group were to be returned to the present writer by the dates presented in Table I.

Table I

Schedule of Return Mailing Dates

	Group I	Group II
Envelope #1	Upon completion of the initial questionnaire	
Envelope #2	August 30	September 6
Envelope #3	September 13	September 20
Envelope #4	September 27	October 4
Envelope #5	October 11	October 18
Envelope #6	Upon completion of the football season	

Analysis of the Data

After all data were received, responses in each category were totalled and percentages were calculated. To compare differences between the frequency of occurrences in selected categories, a chi square test was employed.[1]

[1]Robert G. D. Steel and James H. Torrie, Principles and Procedures of Statistics, (New York: McGraw-Hill Book Company, Inc., 1960), p. 352.

Differences Between Divisions. The injury report cards were sent to the head football coach of all 193 high schools listed as participating in football in the 1974 South Dakota High School Activities Association Directory.[2] Subsequent to the printing of the 1974 Directory, and the mailing of the packets to the participating schools, respondents from four high schools indicated they had dropped their football programs: thus, 189 high schools were included in the survey. A list of participating high schools appears in Appendix A. The number of respondents that returned the injury report cards in each division of South Dakota high school football is indicated in Table II.

Table II

Respondents Completing Injury Report Cards by Division

	Class A	Class B	Nine-Man	Eight-Man	Total
Completed Survey %	20(62.5)	47(83.9)	42(80.8)	36(73.5)	145(76.7)
Did Not Complete Survey %	12(27.5)	9(16.1)	10(19.2)	13(26.5)	44(23.3)
Total per Class	32	56	52	49	189

[2]South Dakota High School Activities Association, State High School Directory, 1974-75, (Pierre, South Dakota: The Association, 1974).

From the 145 high schools that completed the survey, the data indicated that among the 5,326 athletes who participated in high school football in South Dakota in 1975, there were 1,121 injuries reported. Of these 1,121 injuries, 953 athletes were injured. One hundred and twenty-seven athletes were reported as injured twice during the season, eighteen athletes were reported as being injured three times, and two athletes were reported to have sustained injuries four times during the season. Of the total number of participants, (5,326) 17.9 per cent of the football players surveyed were reported as injured during the 1975 high school football season in South Dakota. The number of football injuries that were reported in each division of high school football during the 1975 football season are presented in Table III.

Table III

Number of Injuries Reported in Each Football Division

	Football Division				
	Class A	Class B	Nine-Man	Eight-Man	Total
Injuries Reported	252	409	265	195	1121
Total Players	1345	1864	1092	1025	5326
Incidence of Injury	18.7%	21.9%	24.3%	19.0%	21.0%

Respondents from schools participating in nine-man football reported a higher incidence of injury than those in the other divisions. The Class A and eight-man divisions of high schools had the lowest reported incidence of injury, (18.7 per cent and 19.0 per cent respectively.)

Injuries in Football Related Activities. The number of injuries reported to have occurred during specific football activities throughout the season are presented in Table IV.

Table IV

Specific Football Activities Injury Totals

		Football Division				
Activity		Class A	Class B	Nine-Man	Eight-Man	Total
Practice	%	130(51.6)	189(46.2)	112(42.3)	68(34.9)	499(44.5)
Pre Game	%	1(0.4)	2(0.5)	1(0.4)	1(0.5)	5(0.4)
Game	%	117(46.4)	217(53.1)	148(55.8)	125(64.1)	607(54.1)
Half Time	%	0(0.0)	1(0.2)	0(0.0)	0(0.0)	1(0.1)
Post Game	%	0(0.0)	0(0.0)	1(0.4)	0(0.0)	1(0.1)
Other	%	4(1.6)	0(0.0)	3(1.1)	1(0.5)	8(0.8)
Total		252	409	265	195	1121

The largest percentage (54.1) of football injuries were reported to have occurred during game activity. Class A schools were the only reporting group to have indicated a

larger per cent of practice injuries in comparison to the number received in games. The highest percentage of injuries reported to have occurred in activities beyond practice sessions and games was among the nine-man teams, where it was observed that 1.1 per cent of the total number of injuries occurred while the athletes were engaged in other activities.

The largest percentage of injuries occurred during the month of September (47.5 per cent), followed by October (34.8 per cent). The month in which the least number of injuries were reported was July (0.1 per cent). The number of injuries reported to have occurred in football activity by month throughout the season are presented in Table V.

Table V

Injuries Reported by Month

		Football Division				
Month		Class A	Class B	Nine-Man	Eight-Man	Total
July	%	0(0.0)	0(0.0)	1(0.4)	0(0.0)	1(0.1)
August	%	59(23.5)	79(19.3)	42(15.8)	15(7.7)	195(17.4)
September	%	105(41.7)	195(47.7)	124(46.8)	108(55.4)	532(47.5)
October	%	88(34.9)	133(32.5)	98(37.0)	72(36.9)	391(34.8)
November	%	0(0.0)	2(0.5)	0(0.0)	0(0.0)	2(0.2)
Total		252	409	265	195	1121

Incidence of Injury to Specific Body Parts. The distribution of reported football injuries, to specific body parts appears in Table VI.

Table VI

Distribution of Injuries According to Body Parts

	Football Division				
Body Part	Class A(%)	Class B(%)	Nine-Man(%)	Eight-Man(%)	Total(%)
Upper Extremity					
Hand & Wrist	29(11.5)	34(8.3)	19(7.2)	27(13.8)	109(9.7)
Lower Arm	8(3.2)	6(1.5)	5(1.9)	2(1.0)	21(1.9)
Elbow	3(1.2)	16(3.9)	8(3.0)	1(0.5)	28(2.5)
Upper Arm	3(1.2)	8(2.0)	5(1.9)	4(2.1)	20(1.8)
Shoulder	16(6.3)	32(7.8)	20(7.5)	15(7.7)	83(7.4)
Subtotal	59(23.4)	96(23.5)	57(21.5)	49(25.1)	261(23.3)
Trunk & Head					
Head & Face	32(12.7)	19(4.6)	12(4.5)	13(6.7)	76(6.8)
Neck	6(2.4)	16(3.9)	8(3.0)	15(7.7)	45(4.0)
Chest	7(2.8)	14(3.4)	4(1.6)	4(2.1)	29(2.6)
Back	14(5.5)	40(9.8)	17(6.4)	15(7.7)	86(7.7)
Abdomen	3(1.2)	4(1.0)	3(1.1)	4(4.2)	14(1.2)
Hip	7(2.8)	15(3.7)	8(3.0)	6(3.2)	36(3.2)
Subtotal	69(27.4)	108(26.4)	52(19.6)	57(29.3)	286(25.5)
Lower Extremity					
Upper Leg	19(7.5)	27(6.6)	27(10.2)	17(8.7)	90(8.0)
Knee	46(18.2)	67(16.4)	64(24.2)	45(23.1)	222(19.8)
Lower Leg	13(5.2)	17(4.1)	12(4.5)	8(4.1)	50(4.5)
Foot & Ankle	42(16.7)	92(22.5)	48(18.1)	17(8.7)	199(17.7)
Subtotal	120(47.6)	203(49.6)	151(57.0)	87(44.6)	561(50.0)
Other	4(1.6)	2(0.5)	5(1.9)	2(1.0)	13(1.2)
Total	252	409	265	195	1121

Of the body parts investigated, the three having the highest percentage of injury were the knee, the foot and ankle, and the hand and wrist. The results of the chi square analysis for the comparison of the frequencies of knee injuries in each division of football are presented in Table VII.

Table VII

Chi Square Test for Knee Injuries

	Football Division				
Frequency of Injury	Class A	Class B	Nine-Man	Eight-Man	Total
Observed %	46(18.2)	67(16.4)	64(24.2)	45(23.1)	222(19.8)
Expected	50	81	52.4	38.6	

$x^2 = 6.369$, $p = .0963$, $df = 3$

Results of the chi square test revealed no significant difference in the number of knee injuries received by participants in each football division. The knee (19.8 per cent) was reported to be the body part most frequently injured. The incidence of injuries to the knee for those teams playing nine-man (24.2 per cent) and eight-man (23.1 per cent) football was higher than those playing Class A (18.2 per cent) or Class B (16.4 per cent).

A comparison of the frequencies of foot and ankle

injuries in each division through the use of a chi square test is presented in Table VIII.

Table VIII

Chi Square Test for Foot and Ankle Injuries

	Football Division				
Frequency of Injury	Class A	Class B	Nine-Man	Eight-Man	Total
Observed %	42(16.7)	92(22.5)	48(18.1)	17(8.7)	199(17.7)
Expected	44.8	72.6	47	34.6	

$x^2 = 20.142$, $p < .001$, $df = 3$

The foot and ankle body part was reported to have been injured 17.7 per cent of the time. Results of the chi square test indicated that respondents with football teams competing in the Class B division, reported a significantly higher ($p < .001$) incidence (22.5 per cent) of foot and ankle injuries. Conversely, the same table also indicates a substantially lower incidence (8.7 per cent) of foot and ankle injuries to those teams that competed in the eight-man division.

A comparison of frequencies of hand and wrist injuries resulting from the use of a chi square test appears in Table IX.

Table IX

Chi Square Test for Hand and Wrist Injuries

	Football Division				
Frequency of Injury	Class A	Class B	Nine-Man	Eight-Man	Total
Observed %	29(11.5)	34(8.3)	19(7.2)	27(13.8)	109(9.7)
Expected	24.5	39.8	25.7	19	

$x^2 = 6.789$, $p = .0829$, $df = 3$

According to the results of the chi square test, the number of hand and wrist injuries was not significantly higher or lower in one or more of the football divisions.

The hand and wrist area was reported to have been injured 9.7 per cent of the time. Respondents whose teams played football in Class A and eight-man football, reported a higher incidence of hand and wrist injuries, (11.5 per cent and 13.8 per cent respectively).

Injuries and Types of Football Activity. The type of football activity in which the athletes were involved when injured is presented in Table X. The type of activity that was reported as being related to the largest percentage of injuries, (32.6 per cent) was that of tackling. That statistic is the result of the addition of 2.3 per cent of the injuries reported during drill activity and 30.3 per

cent of the injuries reported to have occurred during game and scrimmage activities. Another 27.3 per cent of the injuries were reported to have occurred during activities which involved being tackled (10.1 per cent) or running with the ball (17.2 per cent). Blocking activity (21.3 per cent) or being blocked (2.6 per cent) was reported as being responsible for an additional 23.9 per cent of the injuries. Seventy-five injuries, or 6.7 per cent of the total, occurred in activities that involved either conditioning (6.1 per cent) or agility drills (0.6 per cent) in which no contact with another football player was involved.

Table X

Injuries During Specific Football Related Activities

Football Activity	Football Division				Total Injuries(%)
	Class A(%)	Class B(%)	Nine-Man(%)	Eight-Man(%)	
Drills					
Conditioning	24(9.5)	27(6.6)	12(4.5)	5(2.6)	68(6.1)
Agility	3(1.2)	2(0.5)	1(0.4)	1(0.5)	7(0.6)
Blocking	14(5.5)	14(3.4)	1(0.4)	3(1.5)	32(2.9)
Tackling	13(5.2)	4(1.0)	7(2.6)	2(1.0)	26(2.3)
Other	2(0.8)	4(1.0)	2(0.8)	2(1.0)	10(0.9)
Subtotal	55(22.2)	51(12.5)	23(8.7)	13(6.7)	143(12.8)
Games and Scrimmages					
Blocking	33(13.1)	76(18.6)	55(20.8)	42(21.5)	206(18.4)
Being Blocked	3(2.8)	11(2.7)	4(1.5)	7(3.6)	29(2.6)
Tackling	75(29.7)	124(30.3)	80(30.2)	61(31.3)	340(30.3)
Being Tackled	18(7.1)	39(9.5)	29(10.9)	27(13.8)	113(10.1)
Running	42(16.7)	71(17.4)	51(19.2)	29(14.9)	193(17.2)
Piling On	9(3.6)	27(6.6)	12(4.5)	6(3.1)	54(4.8)
Kicking	5(2.0)	5(1.2)	5(1.9)	3(1.5)	18(1.6)
Subtotal	189(75.0)	353(86.3)	236(89.0)	175(89.7)	953(85.0)
Other Activities					
Skin Problems	2(0.8)	1(0.2)	1(0.4)	4(2.1)	8(0.7)
Heat Illness	0(0.0)	1(0.2)	1(0.4)	0(0.0)	2(0.2)
Faulty Equipment	2(0.8)	2(0.6)	1(0.4)	1(0.5)	6(0.5)
Miscellaneous	3(1.2)	1(0.2)	3(1.1)	2(1.0)	9(0.8)
Subtotal	7(2.8)	5(1.2)	6(2.3)	7(3.6)	25(2.2)
Total	252	409	265	195	1121

A chi square test that compared the frequency of injuries that occurred during drill activity is presented in Table XI.

Table XI

Chi Square Test for Injuries Occurring During Drill Activity

	Football Division				
Frequency of Injury	Class A	Class B	Nine-Man	Eight-Man	Total
Observed %	55(22.2)	51(12.5)	23(8.7)	13(6.7)	143(12.8)
Expected	32.2	52.2	33.7	24.9	

$x^2 = 26.703$, $p < .001$, $df = 3$

A significantly higher ($p < .001$) incidence of injuries during drills (22.2 per cent) was found among Class A schools. However, a comparison of reported frequency of injuries between the divisions which occurred during game or scrimmage activities revealed no substantial difference between the groups. The results of this comparison are presented in Table XII.

Table XII

Injuries that Occurred During Game or Scrimmage Activities

Frequency of Injury	Football Division				
	Class A	Class B	Nine-Man	Eight-Man	Total
Observed %	189(75.0)	353(86.3)	236(89.0)	175(89.7)	953(85.0)
Expected	214.4	347.8	224.9	165.8	

Time-Loss Injuries Two hundred and twenty-five (23.6) per cent) of the 953 participants in high school football activity were reported as injured to the extent that they were classified as being out of competition for the remainder of the season. The amount of time-loss from football activity by each of the injured athletes is presented in Table XIII.

Table XIII

Time-Loss From Football Activity Due to Injury

Days Lost		Football Division: Class A	Class B	Nine-Man	Eight-Man	Total
1 Day	%	55(21.8)	72(17.6)	44(16.6)	28(14.4)	199(17.7)
2 Days	%	35(13.9)	54(13.2)	38(14.3)	25(12.8)	152(13.5)
3 Days	%	31(12.3)	40(9.8)	31(11.7)	27(13.9)	129(11.5)
4 Days	%	11(4.4)	17(4.2)	9(3.4)	10(5.1)	47(4.2)
5 Days	%	18(7.1)	28(6.8)	14(5.3)	19(9.7)	79(7.0)
6 Days	%	7(2.8)	12(2.9)	7(2.6)	4(2.1)	30(2.6)
7 Days	%	14(5.5)	26(6.4)	15(5.7)	15(7.7)	70(6.2)
8 Days	%	13(5.2)	39(9.5)	26(9.8)	19(9.7)	97(8.7)
15 Days	%	4(1.7)	10(2.4)	5(2.0)	3(1.5)	22(2.0)
22-29 Days	%	0(0.0)	1(0.2)	0(0.0)	1(0.5)	2(0.2)
30 or more	%	0(0.0)	1(0.2)	1(0.4)	3(1.5)	5(0.4)
Out for Season	%	52(20.6)	78(19.1)	63(23.8)	32(16.4)	225(20.1)
Unknown	%	12(4.8)	31(7.6)	12(4.5)	9(4.6)	64(5.7)
Total		252	409	265	195	1121

Of the total 1,121 football injuries that were reported, there were 190 injuries (17.0 per cent) that resulted in a player missing eight days or longer before he was able to return to full, normal activity. This figure is the total of the number of days lost over eight but not including those athletes who were lost for the season.

Medical Supervision. For each reported injury, the respondents were also asked to indicate whether or not the injured player was further evaluated by a physician. The number of injuries evaluated by a physician is presented in Table XIV.

Table XIV

Number of Injuries Evaluated by a Physician

	Football Division				
Physician Evaluation	Class A	Class B	Nine-Man	Eight-Man	Total
Evaluated %	185(73.4)	300(73.3)	170(64.2)	147(75.4)	802(71.5)
Not Evaluated %	67(26.6)	109(26.7)	95(35.8)	48(24.6)	319(28.5)
Total Injuries	252	409	265	195	1121

Physicians evaluated 71.5 per cent of the total injuries. Every respondent that participated in the survey was also requested to report the time lapse that occurred between

the injury occurrence and the time that the injured football player was evaluated by a physician. The results for this question appear in Table XV.

Table XV

Interim Between Injury and Physician's Evaluation

		Football Division				
Interim		Class A	Class B	Nine-Man	Eight Man	Total
Same Day	%	110(59.5)	132(44.0)	64(37.6)	53(36.0)	359(44.8)
Next Day	%	54(29.2)	119(39.7)	81(47.6)	66(44.9)	320(39.9)
2 Days	%	9(4.9)	24(8.0)	12(7.1)	11(7.5)	56(7.0)
3 Days	%	5(2.7)	10(3.3)	6(3.5)	10(6.8)	31(3.8)
4 Days	%	3(1.6)	5(1.7)	0(0.0)	3(2.0)	11(1.4)
5 Days	%	2(1.1)	3(1.0)	2(1.2)	1(0.7)	8(1.0)
6 Days	%	0(0.0)	5(1.7)	0(0.0)	0(0.0)	5(0.6)
7 Days	%	0(0.0)	0(0.0)	1(0.6)	0(0.0)	1(0.1)
8-14 Days	%	2(1.1)	2(0.7)	3(1.8)	2(1.4)	9(1.1)
15 or More	%	0(0.0)	0(0.0)	1(0.6)	1(0.7)	2(0.2)
Total		185	300	170	147	802

There were 802 football players reported to have been injured that were evaluated by a physician. Of this number, 84.7 per cent of these athletes were evaluated by a

physician either the same day that they were injured or on the day following their injury. There were twenty-five football players (three per cent) that were not seen by a physician for evaluation until at least five days had passed after the occurrence of their injuries. Class A athletes evaluated by a physician during these periods totalled 88.7 per cent, while injured athletes of the eight-man division comprised 80.9 per cent of the total number of injured athletes. In conjunction with this information, the respondents also identified the person who was responsible for encouraging evaluation by a physician. These results are presented in Table XVI.

Table XVI

Person Responsible for Encouraging Physician's Evaluation

Person Responsible		Football Division: Class A	Class B	Nine-Man	Eight-Man	Total
Coach	%	78(42.2)	168(56.0)	95(55.9)	83(56.5)	424(52.9)
Parent	%	20(10.8)	34(11.4)	36(21.2)	25(17.0)	115(14.3)
Athlete	%	35(18.9)	87(29.0)	38(22.3)	39(26.5)	199(24.8)
Trainer	%	52(28.1)	10(3.3)	1(0.6)	0(0.0)	63(7.9)
Other	%	0(0.0)	1(0.3)	0(0.0)	0(0.0)	1(0.1)
Total		185	300	170	147	802

The high school football coach or the athletic trainer are most frequently the individuals that are directly responsible for providing sports medicine coverage. At each of the participating high schools, these persons referred the injured athletes to physicians for evaluation 60.8 per cent of the time. The athletes themselves or their parents were responsible for the remaining 39.1 per cent of the encouragement to seek physician's evaluations.

Severity of Injuries. A measure of the degree of severity of football injuries is whether or not an injured player is admitted to a hospital. Of the reported 1,121 injuries, the number of players that required admission to

a hospital are presented in Table XVII.

Table XVII

Injuries Resulting in Hospitalization

	Football Division				
Hospital Admission	Class A	Class B	Nine-Man	Eight-Man	Total
Admitted %	33(13.1)	50(12.2)	24(9.1)	23(11.7)	130(11.6)
Not Admitted %	219(86.9)	359(87.8)	241(90.0)	172(88.3)	991(88.4)
Total	252	409	265	195	1121

There were 130 injuries (11.6 per cent of the total 1,121) that were reported to have required hospital admission. Of the total, injured athletes from the Class A division had the highest percentage (13.1 per cent) of required admissions. Class B followed with 12.2 per cent and the nine-man division had the lowest percentage hospitalized with 9.1 per cent.

The type of injuries that caused the athletes to be hospitalized are presented in Table XVIII.

Table XVIII

Type of Injury Causing Hospitalization

Injury Causing Hospitalization	Football Division				
	Class A(%)	Class B(%)	Nine-Man(%)	Eight-Man(%)	Total(%)
Upper Extremity					
Hand & Wrist	4(12.1)	2(4.0)	1(4.2)	1(4.4)	8(6.2)
Lower Arm	2(6.2)	2(4.0)	2(8.3)	1(4.4)	7(5.3)
Elbow	1(3.0)	4(8.0)	0(0.0)	0(0.0)	5(3.8)
Upper Arm	0(0.0)	0(0.0)	2(8.3)	1(4.4)	3(2.3)
Shoulder	0(0.0)	2(4.0)	4(16.6)	2(8.6)	8(6.2)
Subtotal	7(21.3)	10(20.0)	9(37.4)	5(21.8)	31(23.8)
Trunk & Head					
Head & Face	9(27.2)	3(6.0)	3(12.6)	3(13.0)	18(13.8)
Neck	1(3.0)	4(8.0)	1(4.2)	3(13.0)	9(7.0)
Chest	0(0.0)	1(2.0)	0(0.0)	0(0.0)	1(0.8)
Back	4(12.1)	6(12.0)	1(4.2)	2(8.6)	13(10.0)
Abdomen	1(3.0)	1(2.0)	1(4.2)	1(4.4)	4(3.1)
Hip	1(3.0)	1(2.0)	0(0.0)	1(4.4)	3(2.3)
Subtotal	16(48.3)	16(37.0)	6(25.2)	10(43.4)	48(37.0)
Lower Extremity					
Upper Leg	0(0.0)	1(2.0)	1(4.2)	0(0.0)	2(1.5)
Knee	5(15.1)	12(24.0)	4(16.6)	4(17.4)	25(19.2)
Lower Leg	3(9.1)	5(10.0)	2(8.3)	3(13.0)	13(10.0)
Foot & Ankle	2(6.2)	6(12.0)	2(8.3)	1(4.4)	11(8.5)
Subtotal	10(30.4)	22(48.0)	9(37.4)	8(34.8)	51(39.2)
Total	33	50	24	23	130

The specific injury that accounted for the largest percentage of athletes to be hospitalized was the knee (19.2 per cent). Head and face injuries (13.8 per cent) were the second most frequent injury, followed by injuries to the lower leg and back with 10.0 per cent for each. Injuries to the chest (.8 per cent) accounted for the least number of athletes requiring hospitalization.

An additional measure of severity beyond hospitalization is the number of injured athletes that are admitted to a hospital who actually require surgery. A presentation of this data appears in Table XIX.

Table XIX

Injuries Resulting in Surgery

	Football Division				
Surgery	Class A	Class B	Nine-Man	Eight-Man	Total
Yes %	9(3.6)	11(2.7)	7(2.6)	7(3.6)	34(3.0)
No %	243(96.4)	398(97.3)	258(97.4)	188(96.4)	1087(97.0)
Total	252	409	265	195	1121

Of the 130 athletes that required admission to a hospital, thirty-four required surgery. Eleven athletes (2.7 per cent) from the Class B division required surgery. This accounted for the largest number of required surgeries to

any of the four division of football. The largest incidence of injuries requiring surgery by divisions was observed within the Class A and eight-man divisions with 3.6 per cent each. Data related to the specific injuries requiring surgery are presented in Table XX.

Table XX

Type of Injury Requiring Surgery

Injury Requiring Surgery	Football Division				
	Class A(%)	Class B(%)	Nine-Man(%)	Eight-Man(%)	Total(%)
Upper Extremity					
Hand & Wrist	1(11.1)	1(9.1)	2(28.5)	1(14.3)	5(14.7)
Lower Arm	1(11.1)	0(0.0)	1(14.3)	1(14.3)	3(8.8)
Elbow	0(0.0)	1(9.1)	0(0.0)	0(0.0)	1(2.9)
Upper Arm	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Shoulder	0(0.0)	0(0.0)	1(14.3)	0(0.0)	1(2.9)
Subtotal	2(22.2)	2(18.2)	4(57.2)	2(28.6)	10(29.3)
Trunk & Head					
Head & Face	0(0.0)	0(0.0)	0(0.0)	1(14.3)	1(2.9)
Neck	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Chest	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Back	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Abdomen	1(11.1)	0(0.0)	1(14.3)	0(0.0)	2(6.0)
Hip	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Subtotal	1(11.1)	0(0.0)	1(14.3)	1(14.3)	3(8.9)
Lower Extremity					
Upper Leg	0(0.0)	1(9.1)	0(0.0)	0(0.0)	1(2.9)
Knee	4(44.5)	8(72.7)	2(28.5)	3(42.8)	17(50.0)
Lower Leg	1(11.1)	0(0.0)	0(0.0)	1(14.3)	2(6.0)
Foot & Ankle	1(11.1)	0(0.0)	0(0.0)	0(0.0)	1(2.9)
Subtotal	6(66.7)	9(81.8)	2(28.5)	4(51.7)	21(61.8)
Total	9	11	7	7	34

Surgery to the knee was required in seventeen cases, or 50.0 per cent of the total surgical treatments performed. The hand and wrist body part required 14.7 per cent of the total surgeries followed by the lower arm which required 8.8 per cent of the surgical procedures. The lower leg, (6.0 per cent), abdomen (6.0 per cent), elbow, shoulder, head and face, foot and ankle and upper leg (each 2.9 per cent) accounted for the remainder (26.5 per cent) of the surgeries performed.

Discussion of the Results

Injury survey packets were sent to the head football coaches of all 193 high schools participating in football in 1975 in South Dakota. Correspondence with four respondents indicated that the football programs at their respective schools were dropped, thus lowering the number of participants in the present study to 189. Of this number, 145 schools (76.7 per cent) returned the injury report cards to complete the study.

The respondents reported that 5,326 athletes participated in football programs in 1975, and 953 of the participants were reported as having sustained 1,121 injuries. Thus, 17.9 per cent of the total number of participants were reported as injured during the 1975 football season. The total incidence of injuries was 21.0 per cent.

A review of the pertinent literature revealed few consistent patterns in the type and incidence of player

injuries. In those studies where the questionnaire method of data collection was employed some similarities in incidence of injury were observed. The California study, by Neilson, indicated a twenty-two per cent incidence of injury rate whereas in the present South Dakota study there was a twenty-one per cent incidence.[1] Studies by Blyth and Mueller, and Garrick and Requa, indicate higher incidences of injury (48.8 per cent and 86.0 per cent respectively). These figures are a result of more accurate methods of data collection than the questionnaire in that both studies acquired data through the use of trained record keepers.[2, 3]

According to past investigation, smaller schools accounted for a higher incidence of injury.[4] Data obtained in the present study does not support these findings. Although the differences between divisions of schools were

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[1]N. P. Neilson, "The Nature, Frequency, and Age Incidence of Injuries in Interscholastic Football", The Research Quarterly, (Washington, D.C.: American Physical Education Association), Vol. IV, No. 3, October 1933, p. 78.

[2]Carl S. Blyth and Frederick O. Mueller, An Epidemiologic Study of High School Football Injuries in North Carolina - 1968-1972, U. S. Consumer Product Safety Commission Publication 5203-0054, (Washington, D. C.: U. S. Government Printing Office), p. 3.

[3]James G. Garrick and Ralph K. Requa, "Paramedical Surveillance of High School Football Practices and Games", Medicine and Science in Sports, (Madison, Wisconsin: American College of Sports Medicine), Vol. 6, No. 1, Spring 1974, p. 78.

[4]Blyth and Mueller, p. 87.

not signficant in the present investigation, the lowest incidence of injury was experienced by schools in the Class A division (18.7 per cent), which include the thirty-two largest schools followed by the eight-man division (19.0 per cent), which include the smaller schools participating in football in South Dakota. The lack of training on the part of the person responsible for the recognition of injuries, or the absence of numbers of players engaged in competition at any given time, might provide at least a partial explanation for these differences.

Most of the previous investigations reported a higher incidence of injuries in practice rather than in games. Garrick and Requa reported that the greatest number of injuries occurred during practices (73.0 per cent) in comparison to twenty-seven per cent of the injuries incurred during game activity.[5] Only the study by Elbel, which was conducted in Kansas, indicated a larger percentage of game injuries (57.4 per cent) over practice (42.6 per cent) injuries.[6] The data obtained in the present study also indicates a higher game percentage of injury (54.1 per cent) over that of practice (44.5 per cent). Only data from the Class A division of football

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[5]Garrick and Requa, p. 78.

[6]Edwin Elbel, "Athletic Injuries in Kansas High Schools", Bulletin of Education, (Lawrence: University of Kansas), Vol. 5, Fall 1950, p. 1.

in the present study indicated an incidence of injury during practice (51.6 per cent) higher than that of game activity (46.4 per cent). This figure could be due to the lack of physicians and other medical personnel present at practices, whereas at games, more people are present to assist in the recognition and subsequent evaluation of injuries.

Past studies have revealed that the greatest number of injuries are reported to have occurred prior to mid-season.[7] The majority (65.0 per cent) of the reported injuries in the present study also occurred prior to mid-season.

The injury to specific body parts reported in the present study parallels the data of the literature reviewed. The outcome of all but one study reviewed, indicates the knee to be the most frequently injured body part. Also, in agreement with the majority of the studies reviewed, the second most frequently injured body part is the foot and ankle. In the present investigation knee injuries (19.8 per cent) ranked as the most frequently injured body part followed by the foot and ankle (17.7 per cent) and the hand and wrist (9.7 per cent). Chi square analysis of each of these specific body parts were employed and indicated no significant differences between

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[7] Blyth and Mueller, p. 89.

divisions of football in the number of each type of injury. It was noted however, that there was a significantly higher incidence of foot and ankle injuries in the Class B division, and a substantially lower incidence of foot and ankle injuries reported among the eight-man schools.

The activity of tackling accounted for the highest percentage (32.6 per cent) of all those activities in which players were engaged when injured. The next highest incidence of injury was observed in the act of being tackled (27.2 per cent). Blocking activity (23.9 per cent) accounted for the third highest incidence of injury.

As a result of injuries received during football activities some of the players were unable to participate for extended periods of time. Of the 953 participants reported as being injured, 225 (23.6 per cent) of these individuals were injured to the extent that they were no longer able to compete for the remainder of the season. Additionally, 190 (17.0 per cent) athletes missed eight days or more due to their injuries. There were 199 athletes (17.7 per cent) that missed only one day of football activity. One hundred and fifty-two players (13.5 per cent) missed two days of activity and 129 (11.5 per cent) missed three days of activity. Injuries causing time-loss other than those classified as out for the season or missing up to three days were significantly

smaller in numbers.

An analysis of the data comparing the type of injury causing the greatest time-loss within a seven day period revealed that the lower extremity body area received the highest percentage of injuries. The categories of the foot and ankle, (19.0 per cent) the knee, (17.4 per cent) and the hand and wrist (10.0 per cent) accounted for the greatest time-losses.

In the present investigation, it was found that 802, or71.5 per cent of the injuries reported were evaluated by a physician. Respondents also indicated the period of time between the actual occurrence of the injury and the evaluation. There were 679 athletes (84.7 per cent) that were evaluated within two days of injury occurrence. There were twenty-three injured athletes (2.8 per cent) that were not seen by a physician until five days after their injury and two athletes (.2 per cent) who did not seek medical attention until at least fifteen days had passed. As stated by Garrick and Requa, coaches recognize eighty-five per cent of all game injuries while only recognizing forty-five per cent of practice injuries.[8] These late occurring evaluations could be a major factor

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[8]James G. Garrick and Ralph K. Requa, "Paramedical Surveillance of High School Football Practices and Games", Medicine and Science in Sports, (Madison, Wisconsin: American College of Sports Medicine), Vol. 6, No. 1, Spring 1974, p. 78.

in the forced early retirement of young athletes from football.

The evaluations of the injuries by physicians were prompted by coaches and trainers 60.8 per cent of the time. The athletes themselves or their parents were responsible for an additional 39.1 per cent of the evaluations. Research indicates that with the utilization of trained personnel familiar with athletic training procedures, evaluations would be encouraged more frequently and sooner after the occurrence of injuries. Garrick and Requa, for example, used certified athletic trainers as injury record keepers in their study, and concluded that much larger injury rates actually exist than are reported and evaluated. They believe that these injuries are not recognized by people who do not have a background in sports medicine.[9] This is demonstrated and supported in the present study by the higher incidence of injury (70.2 per cent) reported by the only certified athletic trainer at the high school level in South Dakota.

Hospital admissions are an indicator of the severity of injuries. Of the 1,121 injuries reported, 130 (11.6 per cent) of these injuries required hospitalization. Similar results were observed in the review of the

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[9]Garrick and Requa, p. 78.

literature.[10] The knee (19.2 per cent) was the body part that most frequently required hospitalization followed by the head and face (13.8 per cent), and the back (10.0 per cent), and the lower leg (10.0 per cent).

Of the number of injuries actually requiring hospitalization, thirty-four (3.0 per cent) of the injuries were of sufficient severity to require surgical treatment. The Class A and eight-man divisions had the highest incidence of required surgery, each with 3.6 per cent. The lowest incidence of injury (2.6 per cent) was reported in the nine-man division. Of the thirty-four injuries that required surgical treatment, operations were completed on the knee in seventeen (50.0 per cent) cases. Injuries of the hand and wrist accounted for 14.7 per cent of the surgical procedures, followed by the lower leg in which 8.8 per cent of the injuries required surgery. The remaining body parts requiring surgery included the lower leg and abdomen, (6.0 per cent each) and the elbow, shoulder, head and face, foot and ankle and upper leg (each with one surgery or 2.9 per cent of the total.)

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[10]Gary L. Martin and Samuel I. Fuenning, "College Football Injury Surveillance", Athletic Training- The Journal of the National Athletic Trainer's Association, (Greenville, North Carolina: National Publishing Company), Vol. 7, No. 4, September 1972, p. 109.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the number, location, cause, and frequency of occurrence of football injuries that occurred during the 1975 season in South Dakota high schools.

Survey packets were sent to the head football coach of each of the 189 participating high schools. One hundred and forty-five (76.7 per cent) of the schools completed the injury survey cards throughout the season. There were 5,326 athletes reported to have participated in football at the high school level in 1975. Completed survey results indicate that there were 1,121 injuries that were received by 953 athletes. The incidence of injury rate was 21.0 per cent in comparison to the actual participant injury rate which was 17.9 per cent.

Injuries reported during the current study period indicate that injuries occurred more frequently in game (54.1 per cent) activities than in practice (44.5 per cent.). The majority (65.0 per cent) of the injuries occurred during the first half of the 1975 season. The specific body parts injured most frequently include the knee (19.8 per cent), foot and ankle (17.4 per cent), and the hand and wrist (9.7 per cent). Injuries were

received in greatest numbers while engaged in tackling (32.6 per cent) followed by being tackled (27.2 per cent) and activities related to blocking (32.9 per cent).

Actual time losses varied as a result of the injuries received by the 953 injured participants. Two hundred and twenty-five (23.6 per cent) of the athletes were unable to complete the season. An additional 190 athletes (17.0 per cent) missed eight days or more due to their injuries. Further breakdown of time lost due to injury indicates that 199 athletes (17.7 per cent) missed one day, 152 athletes (13.5 per cent) missed two days and 129 athletes (11.5 per cent) missed three days of activity. Injuries to body parts causing the greatest time-loss within a seven day period were found primarily within the lower extremities. Of this area, the part receiving the greatest number of injuries was the foot and ankle (19.0 per cent) followed by the knee (17.4 per cent) and the upper leg (9.8 per cent).

There were 802 injuries (71.5 per cent) reported that received physician's evaluations and of these, 679 (84.7 per cent) were evaluated within two days of the injury. The majority (60.8 per cent) of the evaluations were referred by coaches and trainers while parents and athletes themselves accounted for an additional 39.1 per cent.

These evaluations resulted in hospital admissions in 130 (11.6 per cent) cases. The knee (19.2 per cent)

ranked highest of the injuries that required hospitalization. There were thirty-four (3.0 per cent) surgical operations and of this number, seventeen (50.0 per cent) of them were performed on the knee.

According to the data obtained in the present study, it can be concluded that one out of every five participants in football will be injured. Thirty-seven per cent of those injured athletes will miss eight days or more as a result of their injuries. Of this group, approximately one-third will be hospitalized. Three per cent of those injured will require surgery and half of those surgeries performed will be to the knee.

Conclusions

Within the limitations of this study, the following conclusions seemed warranted:

1. Approximately one-fifth of all high school varsity and junior varsity football players in South Dakota were injured during the 1975 season.

2. Sixty-five per cent of all injuries occurred prior to the mid-point of the season.

3. The largest number of injuries were reported during games.

4. The body part which was injured most frequently was the knee.

5. Injuries resulting in the greatest time loss within a seven day period following occurrence were those

involving the foot and ankle.

6. The majority of physician referrals were made by coaches and trainers.

7. Injuries to the knee required hospitalization and surgery more frequently than those related to any other body part.

Implications

The primary goal in solution to the present situation is to acquaint school administrators with the need for greater emphasis on injury reduction. After this is achieved, progress can be made toward providing adequate sports medicine coverage for high school athletic programs. Accurate recognition of football injuries requires that an individual with a sports medicine background be in attendance at all practices and games. Without the presence of appropriately trained personnel, it is quite possible that many additional injuries would go unrecognized, subsequently untreated, and thus result in the forced early retirement of athletes. Requiring some level of expertise in the field of sports medicine in combination with periodic in-service training should become a standard procedure in the procurement and retention of coaches in South Dakota.

Additionally, changes in present approaches to the organization of practices should assist in the reduction of injuries. A major emphasis towards the elimination of

injuries, by prevention, should become the paramount goal of all of those involved in or associated with the coaching field.

Recommendations

Based on the findings of this study, the writer proposes the following recommendations for further study.

1. That a similar study be conducted using more accurate instruments for data collection.

2. That a similar study be conducted utilizing more highly trained personnel to serve as record keepers.

3. That a similar study be conducted to survey football injuries in other geographical locations.

4. That a similar study be conducted with additional follow-up to facilitate a larger rate of return.

5. That a similar study be conducted at other levels of football competition, such as prep school, college and professional.

6. That a similar study be conducted in South Dakota utilizing identical procedures to assess the nature and scope of injuries among high school football players in South Dakota during subsequent seasons.

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APPENDICES

APPENDIX A

List of Participating High Schools with Respective Coaches and Recorders

Class A High Schools

High School and Coach	Recorder
Aberdeen Central High School * Aberdeen, South Dakota 57401 Jack Nissen	Jack Nissen
Aberdeen Roncalli High School Aberdeen, South Dakota 57401 Francis Zacher	Francis Zacher
Belle Fourche High School Belle Fourche, South Dakota 57717 Larry Krupa	Larry Krupa
Brandon Valley High School * Brandon Valley, South Dakota 57005 Glenn Sellevold	Mary O'Connor
Brookings High School Brookings, South Dakota 57006 Gary Meeder	LeRoy Klavetter
Canton High School Canton, South Dakota 57013 Burdell Coplan	Burdell Coplan
Chamberlain High School * Chamberlain, South Dakota 57325 Mike Daley	Mike Daley
Cheyenne-Eagle Butte High School Eagle Butte, South Dakota 57625 Roger Setzer	Frank Kartch
Douglas High School * Ellsworth Air Force Base South Dakota 57706 David Lyons	Kim Clark
Flandreau Indian School * Flandreau, South Dakota 57028 Berle Johnson	Berle Johnson

Class A High Schools (continued)

High School and Coach	Recorder
Huron High School Huron, South Dakota 57350 Robert Timm	Robert Timm
Lead-Deadwood High School Lead, South Dakota 57754 Bill Jones	Myron J. Sullivan II
Lennox High School Lennox, South Dakota 57039 Pete Vergeldt	Bob Steadman
Madison High School Madison, South Dakota 57042 Dean Koster	Dean Koster
Milbank High School * Milbank, South Dakota 57252 John O. Grein	David Winter
Miller High School Miller, South Dakota 57362 Bob Garry	Bob Garry
Todd County High School Mission, South Dakota 57555 Mick Wysuph	Jim Schlekeway
Mitchell High School Mitchell, South Dakota 57301 Joseph McMacken	Keith Fitzpatrick
Parkston High School Parkston, South Dakota 57366 John Gilman	John Gilman
Theodore F. Riggs High School * Pierre, South Dakota 57501 Don P. Shields	Don P. Shields
Rapid City Central High School * Rapid City, South Dakota 57701 Mike Roach	Mike Roach
Rapid City Stevens High School * Rapid City, South Dakota 57701 Doug Cogan	Doug Cogan

Class A High Schools (continued)

High School and Coach	Recorder
Sioux Falls Lincoln Senior High School Sioux Falls, South Dakota 57105 Jerry Miller	Tom Lubeck
Sioux Falls O'Gorman High School Sioux Falls, South Dakota 57105 Dick Heiberger	Dick Heiberger
Sioux Falls Washington High School Sioux Falls, South Dakota 57102 Denny Moller	Dennis A. Thompson
Sisseton High School Sisseton, South Dakota 57262 Leon Edlund	Leon Edlund
Spearfish High School Spearfish, South Dakota 57262 Ken Bakkegard	Ken Bakkegard
William J. Brown High School * Sturgis, South Dakota 57785 Dale Brooks	Dale Brooks
Vermillion High School * Vermillion, South Dakota 57069 Steve Swisher	Steve Swisher
Watertown High School Watertown, South Dakota 57201 Dale McElhany	Randy Hald
Winner High School * Winner, South Dakota 57580 Harvey Naasz	Harvey Naasz
Yankton High School Yankton, South Dakota 57078 Max Hawk	Jim Miner

Class B High Schools

High School and Coach	Recorder
Alcester High School Alcester, South Dakota 57001 Jerry Joachim	Jerry Joachim
Arlington High School Arlington, South Dakota 57212 Merle Walter	Merle Walter
Beresford High School Beresford, South Dakota 57004 Jim Heeren	Jim Heeren
Britton High School Britton, South Dakota 57430 James M. Eagan	Norman C. Mack
Burke High School * Burke, South Dakota 57523 Jack Broome	Jack Broome
Chester High School * Chester, South Dakota 57016 Tom Main	Tom Main
Clark High School Clark, South Dakota 57225 Dean L. Meyers	Dean L. Meyers
Clear Lake High School Clear Lake, South Dakota 57226 Tom Gauer	Tom Gauer
Custer High School Custer, South Dakota 57730 Thomas Lintz	Tom Lintz
Dell Rapids High School Dell Rapids, South Dakota 57022 Mike Stadem	Chris Rasmusson
DeSmet High School DeSmet, South Dakota 57231 Robert Sprang	Bob Sprang
Doland High School Doland, South Dakota 57436 Keith D. Haggerty	Keith D. Haggerty

Class B High Schools (continued)

High School and Coach	Recorder
Edgemont High School Edgemont, South Dakota 57735 James Puffer	James Puffer
Elk Point High School Elk Point, South Dakota 57025 Glen Nelson	George Von Haden
Eureka High School Eureka, South Dakota 57437 Randy Hermansen	Randy Hermansen
Faulkton High School Faulkton, South Dakota 57438 Marvin Bult	Marvin Bult
Flandreau High School Flandreau, South Dakota 57028 James McGlone	James McGlone
Garretson High School Garretson, South Dakota 57030 Clarence Kooistra	Clarence Kooistra
Gettysburg High School * Gettysburg, South Dakota 57442 Henry L. Wiedrich	Henry L. Wiedrich
Gregory High School Gregory, South Dakota 57533 Rick Dietz	Rod Wendell
Groton High School * Groton, South Dakota 57445 Bobby L. Dubs	Bobby L. Dubs
Harrisburg High School Harrisburg, South Dakota 57032 Ike Hoover	Ike Hoover
West Central High School Hartford, South Dakota 57033 Jim Uttecht	Terry Truex
Hamlin High School Hayti, South Dakota 57241 Tom Rokusek	Tom Rokusek

Class B High Schools (continued)

High School and Coach	Recorder
Highmore High School * Highmore, South Dakota 57745 Tim Garvey	Tim Garvey
Hill City High School Hill City, South Dakota 57745 Terry R. Gukeisen	Terry R. Gukeisen
Hot Springs High School Hot Springs, South Dakota 57747 Larry Ireland	Tom Halls
Howard High School Howard, South Dakota 57349 Lee Briggle	Lee Briggle
Ipswich High School * Ipswich, South Dakota 57451 Rick Wahl	M. Reinschmidt
Andes Central High School Lake Andes, South Dakota 57356 Donald Harrell	Jerry Renken
Lake Preston High School Lake Preston, South Dakota 57249 Jim Chesley	Tom Birath
Lemmon High School Lemmon, South Dakota 57638 Robert Lantgen	Robert Lantgen
Leola High School Leola, South Dakota 57456 Larry Goins	Larry Goins
Tri-Valley High School Lyons, South Dakota 57041 Dale Cunningham	Dale Cunningham
Bennett County High School Martin, South Dakota 57551 Rick Watson	Rick Watson
Northwestern High School Mellette, South Dakota 57461 Gerald Geditz	Rich Howie

Class B High Schools (continued)

High School and Coach	Recorder
Mobridge High School Mobridge, South Dakota 57601 John Salzsiedler	Rodney Moon
Newell High School Newell, South Dakota 57760 Fred Wilson	Fred Wilson
Oelrichs High School Oelrichs, South Dakota 57763 Paul Nelsen	Paul Nelsen
Sully Buttes High School Onida, South Dakota 57564 Bill Witte	Bill Witte
Parker High School Parker, South Dakota 57053 Joe Volz	Paul Walton
Philip High School * Philip, South Dakota 57567 Jerry Rhodes	Jerry Rhodes
Platte High School Platte, South Dakota 57369 Terry Garvey	Terry Garvey
Lyman High School Presho, South Dakota 57568 Dale U. Waysman	Dale U. Waysman Jr.
Redfield High School Redfield, South Dakota 57469 Roland Nielson	Roland Nielson
Salem High School Salem, South Dakota 57078 Bill Wood	Bill Wood
Scotland High School Scotland, South Dakota 57059 David Gassman	David Gassman
Springfield High School Springfield, South Dakota 57062 Richard Hento	Richard Hento

Class B High Schools (continued)

High School and Coach	Recorder
Tyndall High School Tyndall, South Dakota 57066 Ken Liveris	Ken Liveris
Sioux Valley High School * Volga, South Dakota 57071 Harry Prendergast	Harry Prendergast
East Charles Mix High School Wagner, South Dakota 57380 Joe Hoff	Joe Hoff
Webster High School Webster, South Dakota 57274 Terry Meek	Gary Markuson
Wessington Springs High School Wessington Springs, South Dakota 57382 Ken Koistinen	Ken Koistinen
Willow Lake High School * Willow Lake, South Dakota 57278 David Renfrow	David Renfrow

Nine-Man Schools

High School and Coach	Recorder
Hanson High School Alexandria, South Dakota 57311 Lowell Somsen	Lowell Somsen
Armour High School Armour, South Dakota 57313 Rick Clark	Delwyn DeVries
Avon High School Avon, South Dakota 57315 Tim Nelson	Tim Nelson
Bonesteel High School Bonesteel, South Dakota 57317 Richard Nelson	Rick Nelson
Tri Country High School Bridgewater, South Dakota 57319 Gene Gillen	Al Graber
Canistota High School Canistota, South Dakota 57012 Merland Torkelson	Merland Torkelson
Castlewood High School * Castlewood, South Dakota 57223 Dennis DeJong	Dennis DeJong
Centerville High School Centerville, South Dakota 57014 Steve Weier	Steve Weier
Conde High School Conde, South Dakota 57434 Darel Peterson	Darel Peterson
Delmont High School * Delmont, South Dakota 57330 Gene Hagerty	Alvin D. Mayer
Dupree High School Dupree, South Dakota 57623 Bill Carmody	Bill Carmody
Elkton High School * Elkton, South Dakota 57026 Gene DenHerder	Gene DenHerder

Nine-Man Schools (continued)

High School and Coach	Recorder
Emery High School Emery, South Dakota 57332 Arthur Schuck	Carol Lubbers
Estelline High School Estelline, South Dakota 57234 Doug Dorher	Doug Dorher
Fairfax High School Fairfax, South Dakota 57335 Wallace Bosch	Wallace Bosch
Faith High School * Faith, South Dakota 57626 Patrick C. Mullen	Patrick C. Mullen
Florence High School Florence, South Dakota 57235 Tony Kludt	Gary Knudson
Freeman High School Freeman, South Dakota 57029 Don Diede	Don Diede
Geddes High School Geddes, South Dakota 57342 James H. Schaeffer	D. A. Varuska
Hitchcock High School * Hitchcock, South Dakota 57348 Harvey DeJong	Harvey DeJong
Hurley High School Hurley, South Dakota 57036 Mike Anderson	Mike Anderson
Irene High School Irene, South Dakota 57353 Darrell Hersom	Darrell Hersom
Iroquois High School Iroquois, South Dakota 57353 Robert Zell	Robert Zell
Jefferson High School Jefferson, South Dakota 57038 Gary Seiler	Gary Seiler

Nine-Man Schools (continued)

High School and Coach	Recorder
Langford High School Langford, South Dakota 57454 Calvin Aas	Calvin Aas
Mc Intosh High School Mc Intosh, South Dakota 57641 Lonnie Helfinstine	Lonnie Helfinstine
Marion High School Marion, South Dakota 57043 Ron Laible	Ron Laible
Midland High School Midland, South Dakota 57552 Roger Johnson	Roger Johnson
Montrose High School Montrose, South Dakota 57048 Scott Freeman	Bruce Falk
Murdo High School Murdo, South Dakota 57559 Larry Buck	Clyde Millslagle
New Effington High School * New Effington, South Dakota 57255 Frank Konda	Frank Konda
New Underwood High School New Underwood, South Dakota 57761 Gerald Engelson	Gerald Engelson
Polo High School Orient, South Dakota 57467 Mike Mikuska	Loren Jerde
Grant-Deuel High School Revillo, South Dakota 57259 Tom Ludens	Tom Ludens
Crow Creek Reservation High School Stephan, South Dakota 57346 Gary Miller	Gary Miller
Summit High School Summit, South Dakota 57266 Tom W. Frankenhoff	Tom W. Frankenhoff

Nine-Man Schools (continued)

High School and Coach	Recorder
Veblen High School Veblen, South Dakota 57270 David Krause	David Krause
Wakonda High School Wakonda, South Dakota 57073 Lennis Hofer	Lennis Hofer
Wall High School Wall, South Dakota 57790 Gale Patterson	Gale Patterson
Warner High School * Warner, South Dakota 57479 Dale Aman	Dale Aman
Waubay High School Waubay, South Dakota 57273 Bob Haugen	Bob Haugen
Waverly High School Waverly, South Dakota 57202 Rick Swenson	Rick Swenson
Wessington High School * Wessington, South Dakota 57381 Ted Knudsen	Ted Knudsen
Deubrook High School White, South Dakota 57276 Loren McKinney	Loren McKinney
Wilmot High School Wilmot, South Dakota 57279 Robert Tennis	Robert Tennis
Wood High School * Wood, South Dakota 57585 James Ruedebusch	James Ruedebusch

Eight-Man Schools

High School and Coach	Recorder
Alpena High School Alpena, South Dakota 57312 Scott Wiblemo	Scott Wiblemo
Artesian High School Artesian, South Dakota 57314 Mark Hasz	Mark Hasz
Baltic High School Baltic, South Dakota 57003 James Gednalske	James Gednalske
Bison High School Bison, South Dakota 57620 Dean Fudge	Dean Fudge
Bowdle High School * Bowdle, South Dakota 57428 Terry Stulken	Terry Stulken
Bristol High School Bristol, South Dakota Carlton Hupke	Carlton Hupke
Harding County High School Buffalo, South Dakota 57720 Donald Ostenson	Donald Ostenson
Canova High School Canova, South Dakota 57321 Donald Plahn	Donald Plahn
Carthage High School Carthage, South Dakota 57323 Wally Weatherford	Wally Weatherford
Colman High School Colman, South Dakota 57017 Lyle Pagel	Lyle Pagel
Colome High School Colome, South Dakota 57528 Vennie Heibel	Vennie Heibel
Corsica High School Corsica, South Dakota 57328 Kenneth Wagner	Kenneth Wagner

Eight-Man Schools (continued)

High School and Coach	Recorder
Cresbard High School Cresbard, South Dakota 57435 Dave Marlette	Dave Marlette
Egan High School Egan, South Dakota 57024 William C. Bremmer III	Ray Reidburn
Ethan High School Ethan, South Dakota 57334 William Fritzemier	William Fritzemier
Stanley County High School Ft. Pierre, South Dakota 57532 Paul Schreiner	Paul Schreiner
Frederick High School * Frederick, South Dakota 57441 Kenneth Pudwill	Kenneth Pudwill
Gary High School * Gary, South Dakota 57237 Curtiss Curr	Curtiss Curr
Gayville Volin High School Gayville, South Dakota 57031 Ronald Budde	Ronald Budde
Harrold High School Harrold, South Dakota 57536 Dennis Marso	Dennis Marso
Hecla High School Hecla, South Dakota 57446 Tom Mattheis	Tom Mattheis
Henry High School Henry, South Dakota 57243 Ray Luurs	Ray Luurs
Herreid High School Herreid, South Dakota 57632 Ron Reede	Ron Reede
Hosmer High School * Hosmer, South Dakota 57448 Rodney Oksendahl	Rodney Oksendahl

Eight-Man Schools (continued)

High School and Coach	Recorder
Hoven High School Hoven, South Dakota 57450 Jerry Elshere	Jerry Turner
Hudson High School * Hudson, South Dakota 57034 Mike Seivert	Mike Seivert
Isabel High School Isabel, South Dakota 57633 Warren Sporer	Warren Sporer
Java High School * Java, South Dakota 57452 Walter Simons	Walter Simons
Kimball High School Kimball, South Dakota 57355 Ron Shomion	Ron Shomion
Little Wound-Kyle High School * Kyle, South Dakota 57359 Patrick Baduck	Patrick Baduck
Letcher High School Letcher, South Dakota 57359 James Sattler	James Sattler
Lower Brule High School * Lower Brule, South Dakota 57548 Fred Gulseth Jr.	Fred Gulseth Jr.
Mc Laughlin High School Mc Laughlin, South Dakota 57642 Jerry Brooks	Jerry Brooks
Menno High School Menno, South Dakota 57045 Lawrence J. Buck	Lawrence J. Buck
Sunshine Bible Academy Miller, South Dakota 57362 Marlow Pedersen	Marlow Pedersen
Northwestern Lutheran Academy Mobridge, South Dakota 57601 Carl M. Lemke	Carl M. Lemke

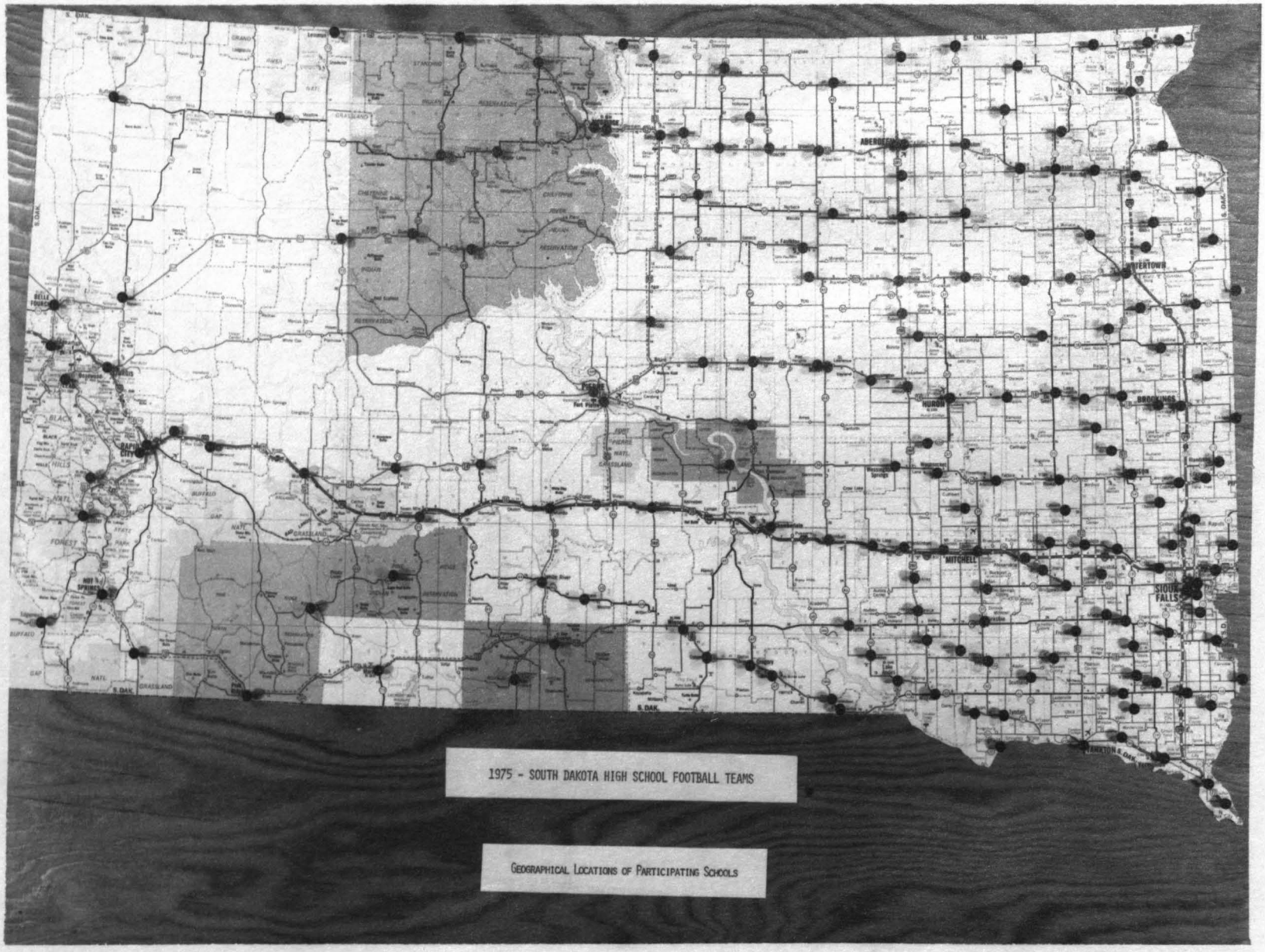
Eight-Man Schools (continued)

High School and Coach	Recorder
Mt. Vernon High School Mt. Vernon, South Dakota 57363 Richard Meister	Richard Meister
Oldham High School * Oldham, South Dakota 57051 Richard Heiberger	Richard Heiberger
Plankinton High School Plankinton, South Dakota 57368 Gene Hagerty	Gene Hagerty
Pollock High School * Pollock, South Dakota 57648 Darwin Salonen	Darwin Salonen
Ramona High School * Ramona, South Dakota 57054 Thomas Weatherford	Thomas Weatherford
Roscoe High School Roscoe, South Dakota 57471 Harry Himmerich	Harry Himmerich
Rosholt High School Rosholt, South Dakota 57260 Robert Thompson	Robert Thompson
Roslyn High School Roslyn, South Dakota 57261 Bruce K. Olson	Bruce K. Olson
Rutland High School Rutland, South Dakota 57057 Paul Tanke	Paul Tanke
St. Francis Indian High School St. Francis, South Dakota 57572 Jack Heizelman	Jack Heizelman
Selby High School * Selby, South Dakota 57472 John Hoover	John Hoover
South Shore High School South Shore, South Dakota 57263 Paul Marso	Todd Drake

Eight-Man Schools (continued)

High School and Coach	Recorder
Spencer High School * Spencer, South Dakota 57374	Pat McCormick
Timber Lake High School Timer Lake, South Dakota 57656 Ben Ehly	Ben Ehly
Tripp High School Tripp, South Dakota 57376 Steve Entringer	Russ Weller
Tulare High School Tulare, South Dakota 57476 Robert Engelstad	Robert Engelstad
Viborg High School Viborg, South Dakota 57070 Mark D. Nelson	Mark D. Nelson
Crazy Horse High School Wanblee, South Dakota 57577 John Lakner	John Lakner
White Lake High School * White Lake, South Dakota 57383 Phil Moore	Phil Moore
Wolsey High School * Wolsey, South Dakota 57384 James Larson	James Larson
Woonsocket High School Woonsocket, South Dakota 57385 Jerry Jenssen	Everett Lanphor
Kadoka High School Kadoka, South Dakota 57543 Jerry Renken	Jerry Renken
Red Cloud Indian High School Pine Ridge, South Dakota 57770 James Swartz	James Swartz
White River High School White River, South Dakota 57579 Harry Haanen	Harry Haanen

(* - indicates schools with incomplete survey results.)



1975 - SOUTH DAKOTA HIGH SCHOOL FOOTBALL TEAMS

GEOGRAPHICAL LOCATIONS OF PARTICIPATING SCHOOLS

APPENDIX B

Injury Survey Packet

SOUTH DAKOTA HIGH SCHOOL ACTIVITIES ASSOCIATION

D. W. EVANS, Executive Secretary

Box 1217, Pierre, South Dakota 57501
Telephone 224-4891

CLAR LILEVJEN, Asst. Executive Secretary
R.W. WILKINSON, Asst. Executive Secretary
RUTH REHN, Asst. Executive Secretary

July 25, 1975

To: SDHSAA Member Schools

From: D. W. Evans, Executive Secretary

Subject: Football Injury Study

Dear Members:

I urge your cooperation in this football injury study. The results will be important to the Association and similar organizations in other states.

The higher the percentage of participation the more valuable the study will be, so your cooperation in the collection of data is respectfully solicited.

The purpose of the study is to provide information to serve as a basis for making interscholastic football safer for the participants. At present there is a dearth of data in this area.

Recently high school football has been subjected to adverse publicity due to the alleged brutality of the game resulting in a high incidence of fatalities and crippling injuries. This study is part of an effort to get at the truth in regard to football fatalities and injuries.

Please lend a helping hand.

Dave Evans

SOUTH DAKOTA HIGH SCHOOL INJURY SURVEY

Dear Coach:

As Dave Evans' cover letter indicates, in conjunction with the South Dakota High School Activities Association, data is being gathered on football injuries that will occur this fall among high school athletes in our state. The purpose will be to collect information necessary to evaluate the frequency and nature of football injuries in South Dakota high schools. It is hoped this information will serve as a basis to improve injury prevention and treatment programs throughout the state.

There are three components included in this package:

1. Head Coach Questionnaire of South Dakota High School Injury Survey
2. Questionnaire of Selected Conditioning and Practice Factors
3. Injury Report Cards

Head Coach Questionnaire of South Dakota High School Injuries Survey

Please take 15 minutes to complete this brief questionnaire and return it in the enclosed self-addressed envelope (#1) as soon as possible.

Questionnaire of Selected Conditioning and Practice Factors

Please take 15 minutes to complete this brief questionnaire and return it also in the enclosed self-addressed envelope (#1) as soon as possible.

Injury Report Cards

Please assign someone to fill out the injury report cards as each injury occurs and return them to us bimonthly in the numbered envelopes provided. These cards are brief, short and should take only a few minutes to complete. Also please return in envelope #1 the enclosed blue card indicating who will be filling out the injury report cards.

The South Dakota High School Activities Association will send you the results of the survey sometime in January or February together with a complete computer print out of the injuries sustained by your athletes for your personal records.

Your interest and participation are greatly appreciated.

Sincerely,

Jim Booher

Jim Booher, R. P. T.
Project Coordinator
South Dakota High School Injury Survey

Mike Keough
West River Liaison

Ron Larson
East River Liaison

enclosures

INSTRUCTIONS ON INSIDE FRONT COVER FOR GROUP I

Return Mailing Dates

Include:
1) Coaches Questionnaire
2) Conditioning Questionnaire
3) Blue Card

Group # 1

Envelope #1	- Return as soon as possible	Include 1, 2, & 3
#2	- August 30	Injury Cards
#3	- September 13	Injury Cards and Red Cards
#4	- September 27	Injury Cards
#5	- October 11	Injury Cards
#6	- End of Season	Injury Cards

WHEN INJURY OCCURS:

1) Fill out as much information on the card as possible at time of injury; then replace card to folder. Fill in remaining information when the athlete returns to full normal activity. Place card in next return-mail envelope and mail.

2) If an athlete has not returned to full normal activity when the report period mailing is due, complete questionnaire when he does return to full normal activity and enclose the card in the next mailing.

3) If a card is forgotten for one mailing, simply complete card and return it with the next mailing.

ANY QUESTIONS OR PROBLEMS? CALL COLLECT: MIKE KEOUGH
688 - 5721

INSTRUCTIONS ON INSIDE FRONT COVER FOR GROUP II

Return Mailing Dates

Include:
1) Coaches Questionnaire
2) Conditioning Questionnaire
3) Blue Card

Group # 2

Envelope #1	- Return as soon as possible	Include 1, 2, & 3
#2	- September 6	Injury Cards
#3	- September 20	Injury Cards and Red Card
#4	- October 4	Injury Cards
#5	- October 18	Injury Cards
#6	- End of Season	Injury Cards

WHEN INJURY OCCURS:

1) Fill out as much information on the card as possible at time of injury; then replace card to folder. Fill in remaining information when the athlete returns to full normal activity. Place card in next return-mail envelope and mail.

2) If an athlete has not returned to full normal activity when the report period mailing is due, complete questionnaire when he does return to full normal activity and enclose the card in the next mailing.

3) If a card is forgotten for one mailing, simply complete card and return it with the next mailing.

ANY QUESTIONS OR PROBLEMS? CALL COLLECT: MIKE KEOUGH
688 - 5721

INSTRUCTIONS ON INSIDE BACK COVER

Injury: Traumatic condition which occurs during organized football activity which results in either discontinuation of participation for the remainder of that practice or game, or results in restricting the athlete's usual activity for one day beyond the date of injury.

Full Normal Activity: Capability of the body and its parts to pass through complete pain-free ranges of motion which, in the opinion of the coach and his staff, allow participation in the activity to the extent that is generally expected of the athlete's teammates.

Examples of Injury:

1) An athlete recuperating from an ankle injury is permitted by the physician to TEST the ankle in a practice or game. The athlete finds that he cannot perform the essential tasks with skill and is removed from participation. He has not returned to participation.

2) A football player with an injured elbow is allowed to work out with the team, but only during particular drills not requiring the use of the arm. He has not returned to participation.

3) An athlete with a sprained ankle has been limited to light activity during practices. On Wednesday, the coach lets him take part in a practice scrimmage. The ankle is reinjured. Note Wednesday as both date of return of the initial injury and also date of onset of new reportable injury.

4) A player is disoriented after a tackle, and the athlete is removed from participation so that he can be checked. His head clears in a few minutes; he is returned to play. This is a reportable injury.

BLUE 3 X 5 CARD TO BE RETURNED IN ENVELOPE NUMBER ONE

SOUTH DAKOTA HIGH SCHOOL INJURY SURVEY

At the beginning of the 1975 season, we have _____ participants out for high school football.

I have assigned the following person to be responsible for recording each injury that occurs.

NAME_____ PHONE_____

SCHOOL_____

PINK 3 X 5 CARD TO BE RETURNED IN ENVELOPE NUMBER THREE

SOUTH DAKOTA HIGH SCHOOL INJURY SURVEY

As of September 10, 1975, we have _____ participants out for our high school football team. This number includes all of those injured and no longer out.

SCHOOL_____

ID#_____

SOUTH DAKOTA HIGH SCHOOL INJURY SURVEY
Football Injury Card

Injured Athlete's Name_____ Date of Injury_____

1) Location of Injury: Check box at appropriate site of injury.

☐ foot & ankle	☐ hip	☐ neck	☐ elbow
☐ lower leg	☐ back	☐ head & face	☐ lower arm
☐ knee	☐ abdomen	☐ shoulder	☐ hand & wrist
☐ upper leg	☐ chest	☐ upper arm	☐ other

If other, explain:_____

2) Describe Injury:_____

3) Describe activity causing injury: (blocking, tackling, running, faulty equipment, illegal acts of others, etc.)_____

4) Injury occurred during ☐ practice ☐ game ☐ pre-game ☐ halftime ☐ post-game ☐ other

5) Time loss with Injury: How many days missed before athlete returned to full normal activity?

☐ 1 day ☐ 2 days ☐ 3 days ☐ 4 days ☐ 5 days ☐ 6 days ☐ 7 days ☐ 8 days ☐ Longer: How many days? ___ ☐ Out for season.

6) Was the athlete evaluated by a doctor? ☐ Yes ☐ No

7) If yes, when?

☐ same day ☐ next day ☐ 2 days later ☐ 3 days later ☐ 4 days later ☐ 5 days later ☐ 6 days later ☐ Longer: How many? ___

8) If yes to #6, who encouraged doctor's evaluation?

☐ athlete himself ☐ parents ☐ coach ☐ trainer ☐ teammates ☐ other, who?_____

9) Was the athlete admitted to hospital? ☐ Yes ☐ No

10) Did the athlete have surgery: (Not including sutures)
☐ Yes ☐ No

APPENDIX C

Follow-up Letters

October 25, 1975

Dear Coach:

At this point in time, I would like to thank you for the interest and concern that you have already shown in this very important research survey concerning football injuries in South Dakota.

As the season is rapidly coming to a close, it is very important that all of your athlete's injured are recognized and recorded on the injury cards and then sent in to the survey center. The final results of the total project are dependent upon complete returns that are received by the survey center. It is, therefore, most important that all of your six mailings are completed and returned.

If you are having any problems with the survey or the injury cards, please feel free to give me a collect telephone call at 688 - 5721. Again, thank you for your cooperation in this survey.

Yours truly,

Michael G. Keough
Injury Survey Asst. Coordinator

November 13, 1975

Dear Coach:

The 1975 football season is now finished and is history. Many of the ball players have gone on to play basketball, wrestle and participate in other activities. Several of those individuals were injured playing football and have now recovered, enabling them to participate in the aforementioned activities.

Before those injuries get too far recessed in your mind, please take the time to record them on the injury report cards that are in the football injury survey packet. All six of the scheduled mailings are now due and it would be greatly appreciated by the survey team if you took the time to record those injuries that did occur. Again, if no injuries occurred during a report period, just mark it accordingly on the envelope and return it separately or enclose all of the materials in envelope number six which is to be returned at the end of the season. Complete listings from each school will help to give a true picture of the statewide injury situation, so it is imperative to get your mailings returned.

The survey team wishes to thank you again for participating in this very important survey. As soon as all of the results have been compiled and tabulated, a copy will be sent to you. If there are any problems, call me collect at 688 - 5721.

Yours truly,

Michael G. Keough
Injury Survey Asst. Coordinator

APPENDIX D

Injury Card Code

INJURY CARD CODE

School Code _ _ _

Last Name, First Name _

Date of Injury (Day Month Year) _ _ _ _ _ _ _ _

Item # 1 --- Location of Injury

1	Foot & Ankle	1	Neck
2	Lower Leg	2	Head & Face
3	Knee	3	Shoulder
4	Upper Leg	4	Upper Arm
5	Hip	5	Elbow
6	Back	6	Lower Arm
7	Abdomen	7	Hand & Wrist
8	Chest	8	Other

Item # 2 --- Describe Activity Causing Injury

00 Field Conditions

Conditioning Drills

01 Warmup Drills - N. E. C.

02 Shoulder Rolls

03 Running - N. E. C.

04 Crab Crawl

05 Wind Sprints

06 Neck Builder Exercises

INJURY CARD CODE (continued)

08 Agility Drills - N. E. C.

09 Catching Ball

10 Blocking Drills - N. E. C.

11 Blocking with Boards or Dummies

12 Double Team Blocking

13 Tackling Drills - N. E. C.

14 Oklahoma Dive Roll

15 Ball Carrying Drill - Running

16 Ball Carrying Drill - Ball Carrier

17 One on One Drill - Tackler

18 One on Two Drill - Ball Carrier

Equipment Work

19 7 Man Sled

20 Hit Sled From Run

Offensive Scrimmage Situation

21 Blocking - N. E. C.

22 Running - N. E. C.

23 Scrimmage Offense - N. E. C.

24 Downfield Blocker

Defensive Scrimmage Situation

25 Being Blocked

26 Tackling - N. E. C.

Other Drills

28 Pass Drill - Passer

29 Pass Drill - Receiver

INJURY CARD CODE (continued)

30 Pass Drill - Hit Dummy in Drill

31 Fumble Drill

Game Situation/Activity - Defense

32 Hit on Ground During/After Tackle

33 Tackling From Behind

34 Tackling - N. E. C. - (Defender)

35 Being Blocked

36 Pursuing to Tackle

37 Positioning for Pass Defense

38 Falling in Pursuit

Game Situation/Activity - Offense

40 Being Tackled From Behind

41 Tackling - N. E. C. - (Ball Carrier)

42 Throwing Block - N. E. C.

43 Pileup Injury or Illegal Acts of Others

44 Being Tackled

45 Carrying Ball

46 Running - N. E. C.

47 Hit While Recovering a Fumble

Game Situation/Activity - Specialty

48 Punting and or Kicking

49 Skin Disease Problems - Infections and Boils

50 Heat Related Problems - Heat Cramps, Exhaustion & Stroke

INJURY CARD CODE (continued)

Faulty Equipment

51 Shoes

52 Helmet

53 Faulty Equipment - N. E. C.

* --- N. E. C. - Not Elsewhere Classified

99 Football Injury Other Than Organized School Football

Item # 3 --- Injury Occurred During

1 Practice
2 Game
3 Pre-Game
4 Half-Time
5 Post-Game
6 Other

Item # 4 --- Time-Loss With Injury

01 1 Day
02 2 Days
03 3 Days
04 4 Days
05 5 Days
06 6 Days
07 7 Days
08 8 Days
__ Longer - How Many?
50 Undetermined
99 Out for Season

Item # 5 --- Was the Athlete Evaluated By A Doctor?

___ Yes ___ No

Item # 6 --- If Yes, When?

00 Same Day

01 Next Day

INJURY CARD CODE (continued)

02 2 Days Later

03 3 Days Later

04 4 Days Later

05 5 Days Later

06 6 Days Later

_ _ Longer - How Many?

Item # 7 --- If Yes to # 5, Who Encouraged Doctor's Evaluation?

1 Athlete Himself

2 Parents

3 Coach

4 Trainer

5 Teammates

6 Other

Item # 8 --- Was the Athlete Admitted to the Hospital?

___ Yes ___ No

Item # 9 --- Did the Athlete Have Surgery?

___ Yes ___ No